

## Statement on magnetic bearings



**by Donald E. Bently**

*Chairman and Chief Executive Officer  
Bently Nevada Corporation  
President, Bently Rotor Dynamics  
Research Corporation*

For many years, I have said that magnetic bearings are a good concept, but that their use would be limited to some very specialized applications. Therefore, they would not be a major factor in modern machinery.

Major machinery manufacturers have been advised by their rotor dynamics specialists to avoid significant costs trying to develop successful magnetic bearings.

There are two principal problems with magnetic bearings. First, the direct stiffness available is severely limited because the laminated permeable core on the rotating shaft is limited. Second, the default for such a bearing is some kind of backup bearing, which, on loss of electric energy or fault of the control circuit, cannot prevent considerable machine damage on shutdown.

Although one major bearing company is just getting into magnetic bearings, several others have already dropped out. Several machines fitted with magnetic bearings have had them removed. While the U.S. Air Force may still be

funding magnetic bearings, it is my guess (and suggestion) that the other U.S. defense agencies spend their efforts on something more promising.

This is not all sour grapes, however. The good news is that the studies of magnetic bearings clearly establishes, as common knowledge, that the dynamic equations of rotor systems are of the control system type for both active and passive bearings. Bently Rotor Dynamics Research Corporation (BRDRC) has widely promoted this concept, which has only gained a measure of acceptance in the last few years.

The second piece of good news is that I am certain that active control system bearings will be used extensively in future machinery designs, even though these bearings will probably not be magnetic bearings. Our experiments with alternative designs show that both of the above mentioned principal problems encountered with magnetic bearings can be eliminated. The result will be major improvements in the design of rotating machinery that allow increased efficiency and performance, while lowering costs and reducing gas and liquid leakage to the environment. ■

*If your company or organization wishes to participate in this ongoing development, please contact me at fax number (702) 782-9236. Please send mail to Mr. Donald E. Bently, Bently Nevada Corporation, P.O. Box 157, Minden, NV 89423.*